

## Enhancing suction roll covers with aerospace technology

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Efficient dewatering is the main purpose of every paper machine's press section. Voith Paper has improved this process even further by developing two new suction roll covers: AquaFlow and SolarFlow. Using advanced bonding systems, these new covers can simultaneously achieve the highest levels of dryness and save energy. In addition, Voith Paper continues to examine the potential of the dewatering process at its Paper Technology Center, employing such unique combinations of roll covers and felts, as well as through operational testing.

For many years, the aerospace and automotive industries have used a special bonding process, known as the Interpenetrated Network (IPN), to connect different types of polymers (Fig. 1). Today, Voith Paper is using a similar process in its WebNet technology to create the newest generation of suction roll covers: AquaFlow and SolarFlow, which offer tangible advantages. Thanks to the three dimensional interlinking of individual polymers, the interface between these new covers and the roll shell is even stronger. As a result, these new covers are also much more resilient offering far greater resistance to temperature changes as well as chemical and mechanical stress. Due to these improved characteristics, Voith Paper's WebNet technology will replace the already successful AST-bonding layer which was developed in the 1990s.

### Roll Covers with an Innovative Construction

WebNet technology plays a key role in the construction of these innovative roll covers. Surrounding the roll's metal shell and interface is a fibre-reinforced multi layer base with marginally thicker construction and higher structural elasticity. Here, WebNet technology links the roll's multi layer base with the cover's polyurethane top stock, which Voith Paper also improved for both its AquaFlow and SolarFlow covers. Thanks to these covers' high-density molecular structure, their elasticity, mechanical stability, abrasion resistance, as well as their hydrolytic characteristics, have been significantly improved.

Recently, the advantages of these new polyurethane covers were clearly demonstrated at the Leinfelder Paper Mill in Schwedt, Germany, where linerboard is produced: "Our tests using the SolarFlow and the SolarPress roll covers were a complete success. In the press section of PM 3, the dewatering process was improved by 1 percent," reported Arno Liendl, Technical Director at Leinfelder Schwedt. Additionally, in combination with other improvements, the production speed and output were increased.

### AquaFlow or SolarFlow?

So, what are the main differences between the AquaFlow and SolarFlow covers? Michael Weinzettl, Voith Paper's Product Manager for polyurethane rolls, puts it this way: "AquaFlow covers use the new polyurethane top stock layer, while SolarFlow covers use further enhanced materials."

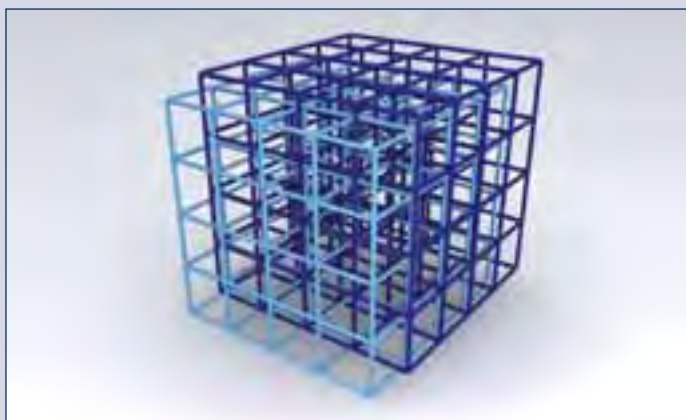


Fig 1. WebNet Technology - three-dimensional polymer network

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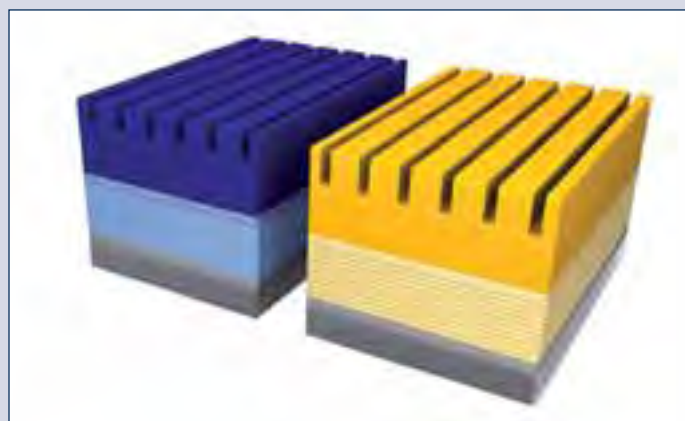


Fig 2. AquaFlow and SolarFlow - deeper grooves for efficient dewatering

SolarFlow covers have a higher surface stability, which assures optimal impounding volumes during actual operations and under high loads. That's also why premium SolarFlow covers are ideally suited for extremely strained suction rolls. Voith Paper experts can precisely tailor a cover's surface characteristics to satisfy its individual installation and operating requirements. "Plus, by using our NipMaster computer simulation we can establish a dewatering profile that also involves various press felt parameters," Mr Weinzettl added.

Thanks to the new structure of the polyurethane layer, these new covers can have even deeper grooves for more effective dewatering (Fig. 2). Specifically, AquaFlow covers have groove depths of up to 2.3 millimetres and widths from 0.5 to 0.9 millimetres, with partitioning between the grooves of 2.0 to 2.5 millimetres. And in the case of SolarFlow covers these dimensions are even more impressive, having groove depths of up to 3.0 millimetres and widths from 0.4 to 0.9 millimetres, with partitioning between the grooves of 1.8 to 2.5 millimetres. In both cases, the deeper grooves used by these covers significantly increase their water storage volume, as well as the speed and efficiency of the dewatering process.

These same characteristics also ensure efficient nip-dewatering and lower hydraulic pressure in the nip itself. As a result, blind holes in the cover's surface, which have a low operating volume due to insufficient drainage, are no longer needed. Thus uhle boxes for felt conditioning can be omitted - which saves energy. Furthermore blind holes often cause shadow marking. In fact, during a test of SolarFlow on a paper machine producing copy paper, shadow marking was completely eliminated and the dryness was increased from 0.7 to 1.0 percent.

### Extended Lifecycles – for Felts too

The lifecycles of AquaFlow and SolarFlow covers are far longer than conventional roll covers. This fact is primarily due to their use of high-quality polyurethane, whose higher abrasion resistance results in far longer replacement intervals - with uniform dewatering characteristics in the nip throughout the cover's lifecycle. When the new covers were tested on a paper machine producing testliner and corrugated paper, the replacement interval was twice as long as conventional covers and, at the same time, nip-dewatering increased. The Scheufelen Paper Mill in Lennigen, Germany, which produces woodfree coated premium paper, has seen similar results. Here, the new roll covers had a particularly positive effect on the press felts: the lifecycle of the pick-up felts increased from 21 to 32 days, while the felt's break-in periods decreased. "We were very impressed with the SolarFlow's performance and we achieved our production targets in a surprising short period of time," commented Ralf Haury, Production Manager at Scheufelen.

At another paper mill, the effect of high-quality roll covers on the press felts was even more dramatic: increasing the felts' lifecycle from 14 to 45 days. "We see the greatest improvement potential in using the right combination of roll covers, felts, and doctor blades" explained Peter Mödl, Product Manager for press felts at Voith Paper. Maximum dewatering can only be achieved when all three of these components work effectively together. "Because even if roll covers are ingenious, when they're not compatible with the felts - their benefits can't be exploited," Mr Mödl added.

#### The Ideal Combination: Cover, Felt and Doctor Blades

With their new E-Flex press felts, Voith Paper offers paper manufacturers another advanced solution. E-Flex felts also have an optimised structure and use polymer interlinking on their inner surface for optimal 'bridging' of the grooves in a roll cover (Fig. 3). This ensures uniform pressure distribution across the entire felt surface. In addition, the elasticity of the E-Flex felt improves its resiliency and ensures more efficient dewatering characteristics throughout its lifecycle. While operating on the paper machine, E-Flex promotes more water flow to the suction roll cover due to the felt structure having marginal flow resistance.

At Voith's Paper Technology Center in Heidenheim, Germany, various combinations of roll covers and felt designs have been tested on the VPM 6 experimental paper machine. These tests have shown that the greatest improvements in the dewatering process

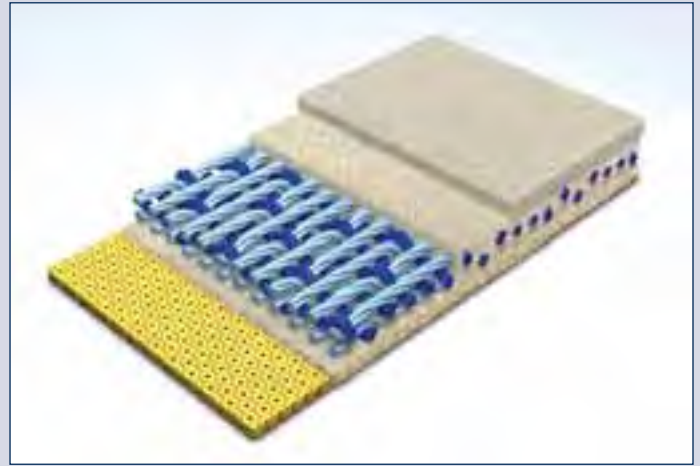


Fig 3. E-Flex Press felts – structure-optimised press felts

can be achieved when the covers and felts are optimally paired. Voith Paper's tests have also shown that in actual operation, the advantages of varying groove depths on AquaFlow and SolarFlow covers can be fully utilised when combined with E-Flex felts. In conclusion, the best results were achieved when the doctor blades were also adapted to suit the roll cover's operating characteristics.

## Supplier Notes

### Hard and software for improved energy efficiency

Honeywell has announced a portfolio of new and existing hardware, software and services to help improve energy efficiency. The portfolio features the new Honeywell Energy Dashboard which gathers information from various instruments and systems and tracks their energy consumption against energy targets. The Energy Dashboard, expected to be available in the fourth quarter of 2009, enables users to establish targets for reducing energy consumption and measures performance against those targets. Once energy saving potential has been identified, the portfolio provides the hardware, software and services necessary to improve performance. Because elements



Honeywell Energy Dashboard concept

of the portfolio can be customised, the system can be implemented in stages starting with smaller scale, quick return on investment projects and moving to more comprehensive, higher value projects.

To learn more about Honeywell Energy management Solutions, contact [suzana.trajanovska@honeywell.com](mailto:suzana.trajanovska@honeywell.com).

### Covey Consulting enters agreement with Bioindustry Partners

Covey Consulting is pleased to announce that it has recently entered into an agreement with BioIndustry Partners Pty Ltd (BIP) to offer a range of services across the biofuels, bio products and biomass processing industries.

BIP was established two years ago by Dr Graeme Bullock, Prof Margaret Britz and Dr Les Edye to provide services including:

- strategic planning for research, development and deployment,
- technical auditing,
- business planning,
- R&D project management and facilitation,
- advisory services for grant scheme applicants
- expert witness services.

BioIndustry Partners also advises on business sustainability, emissions reduction strategies and life cycle assessment outcomes.

These skills will be coupled with Covey Consulting's expertise in business planning, project management, process design, chemical analysis and biomass processing to offer an Australian based 'one-stop' service for most types of bioindustry projects.

For further information contact Covey Consulting at phone +61 (03) 9859 4290 or email [enquiries@coveyconsulting.com.au](mailto:enquiries@coveyconsulting.com.au)